Adrift in a small boat… Kyran Wright waits at a scent patch with his field assistant to test whether African Penguins use smell to locate productive feeding areas.

LLOYD EDWARDS

SOMETHING FISHY

Given the ongoing decreases in African Penguin numbers, it is not surprising that considerable effort is being devoted to better understanding the causes of the population collapse over the past decade. Although penguins face significant problems on land (for example, extreme weather events, disease and the predation of eggs and chicks), the main threats appear to be at sea and are linked to reduced food availability, oil pollution and predation. Post-doctoral Fellow Lorien Pichegru has devoted the past four years to studying the African Penguin 'problem' in Nelson Mandela Bay, Eastern Cape, where St Croix and Bird islands support almost half of all remaining pairs of African Penguins. Numerous questions remain, but some interesting results have emerged.

Much of Lorien's work has focused on the use of spatial management of fisheries to enhance African Penguin breeding performance. She is part of a team examining whether putting a stop to fishing for anchovies and sardines around penguin breeding islands improves conditions for the birds. Initial results were encouraging. When fishing was prohibited within 20 kilometres of St Croix Island in 2009, the penguins breeding there significantly reduced the distance they travelled to find food for their chicks compared to 2008 and in comparison to birds at nearby Bird Island, where there was no fishing ban.

However, subsequent observations published in *Biological Conservation* (doi:10.1016/j.biocon.2011.12.013) show that this measure was insufficient to offset the ongoing decreases in these colonies. The St Croix fishery closure remained in place in 2010, during which time overall fishing pressure in Nelson Mandela Bay remained roughly the same as in 2009, but much of it occurred along the boundary of the closed area. Penguins from St Croix travelled further than they did in 2009 and, although they didn't work as hard as in 2008 when there was no fishing ban, the body condition of adults and the growth rates of chicks decreased. We concluded that more stringent controls were needed to mitigate the impact of fishing around penguin breeding colonies, such as larger no-take zones or limited-effort buffer zones around the no-take zones.

It has become apparent that managing penguin–fishery interactions is limited by our ignorance of fish behaviour. As a result, Lorien has started to track fish schools using a survey boat (see the October/November 2011 issue, page 24). We have also learned more about the penguins' foraging behaviour. In particular, we often wondered how penguins locate fish schools. Given their slow commuting speed relative to flying seabirds, it makes sense that they should have a better strategy than simply random searches to find their prey.

A few years ago, post-doc Greg Cunningham showed that African Penguins could detect and respond to odours, including dimethyl sulphide (DMS), a compound that is released by phytoplankton when their cells are damaged. DMS is known to be a foraging cue for many petrels and given that penguins and petrels are closely related, it seemed plausible that penguins also might use scent to help locate productive foraging areas.

Greg's trials were conducted on land; what we needed was a demonstration that penguins actually respond to DMS at sea. Honours student Kyran Wright took on this challenge, deploying scented slicks of vegetable oil from a small boat in Nelson Mandela Bay. Sure enough, more than twice as many penguins came to visit when the patch was scented with DMS than when it contained cod-liver oil or was left odourless. Kyran concluded that penguins are attracted by DMS because it indicates areas where phytoplankton is being grazed by zooplankton and sardines (see Wright et al. 2011, *J. Exp. Biol.* 214: 2509–2511 for further details).